AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the Claims

1. (Currently Amended) ~~An electronically addressable microchip~~ A device comprising a plurality of ~~electronically programmable~~ microlocations:

wherein the microlocations each comprise an underlying working microelectrode on a substrate,

wherein at least some of the microelectrodes are covered by a permeation layer,

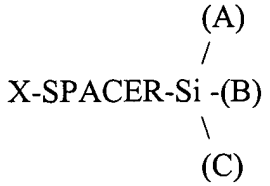
further wherein at at least one microlocation the permeation layer is covalently attached to the electrode by linker moieties,

and wherein the covalent attachment between the electrode and the linker and the permeation layer material is stable at a current density of at least ~~0.04~~ 0.10 nA/μm^2.

2. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1 wherein the permeation layer comprises a material selected from the group consisting of an inorganic sol-gel, a synthetic polymer hydrogel, and a carbohydrate hydrogel.

3. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1 wherein the electrode is selected from the group consisting of platinum silicide (PtSi), tungsten silicide (WSi), titanium silicide (TiSi), gold silicide (AuSi), platinum/titanium (Pt/Ti), gold/titanium (AuTi), poly(phenylene vinylene), polythiophene, and polyaniline.

4. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1 wherein the linker has the formula



wherein:

X is selected from the group consisting of acrylate, methacrylate, acrylamide, methacrylamide, allyl, vinyl, acetyl, amine, substituted amine, epoxy and thiol;

SPACER is selected from the group consisting of alkyl, aryl, mono- or polyalkoxy, ethyleneglycol, polyethyleneglycol, mono- or polyalkylamine, mono- or polyamide, thioether derivatives, and mono- or polydisulfides;

A and B are selected from the group consisting of Oxygen-R, Cl, Br, and an X-SPACER moiety, or any combination thereof, wherein R is H, alkyl, methyl, ethyl, propyl, isopropyl, and branched or linear alkyl of 4 to 10 carbon atoms; and

C is a hydrolyzable moiety selected from the group consisting of Oxygen-R, Cl, and Br, wherein R is H, branched alkyl, methyl, ethyl, propyl, isopropyl, and branched or linear alkyl of 4 to 10 carbon atoms.

5. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is selected from the group consisting of:

$H_2NCH_2CH_2CH_2Si(OCH_3)_3$,

$H_2NCH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$,

$H_2NCH_2CH_2CH_2CH_2CH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(OCH_3)_3$, and

$CH_2=CHCONHCH_2CH_2CH_2Si(OC_2H_5)_3$.

6-14. (Cancelled)

15. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1 wherein the permeation layer is a hydrogel comprising a material selected from the group consisting

of: agarose, glyoxylagarose, acrylamide, methacrylamide, polyacrylamide, and other synthetic polymers

16. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 15 wherein the hydrogel comprises glyoxylagarose.

17. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 15 wherein the hydrogel comprises polyacrylamide.

18. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1 wherein the electrode is a metal/silicide electrode selected from the group consisting of platinum silicide (PtSi), tungsten silicide (WSi), titanium silicide (TiSi), and gold silicide (AuSi).

19. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1 wherein the electrode is a metal/metal electrode selected from the group consisting of platinum/titanium (PtTi) and gold /titanium (AuTi).

20. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1 wherein the electrode is an organic electrode selected from the group consisting of poly(phenylene vinylene), polythiophene, and polyaniline.

21. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is an acrylate linker selected from the group consisting of:

$CH_2=CHCOOCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=CHCOOCH_2CH_2CH_2SiCl_3$,

$CH_2=CHCOOCH_2CH_2CH_2Si(CH_3)(OCH_3)_2$,

$CH_2=CHCOOCH_2CH_2CH_2Si(CH_3)_2(OCH_3)$,

$CH_2=CHCOOCH_2CH_2CH_2Si(CH_3)Cl_2$, and

$CH_2=CHCOOCH_2CH(OH)CH_2NHCH_2CH_2CH_2Si(OC_2H_5)_3$.

22. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is a methacrylate linker selected from the group consisting of:

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2SiCl_3$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(CH_3)(OCH_3)_2$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(CH_3)_2(OCH_3)$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(CH_3)Cl_2$, and

$CH_2=C(CH_3)COOCH_2CH(OH)CH_2NHCH_2CH_2CH_2Si(OC_2H_5)_3$.

23. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is an acrylamide linker selected from the group consisting of:

$CH_2=CHCONHCH_2CH_2CH_2Si(OC_2H_5)_3$,

$CH_2=CHCONHCH_2CH_2CH_2SiCl_3$,

$CH_2=CHCONHCH_2CH_2CH_2Si(CH_3)(OCH_3)_2$,

$CH_2=CHCONHCH_2CH_2CH_2Si(CH_3)_2(OCH_3)$,

$CH_2=CHCONHCH_2CH_2CH_2Si(CH_3)Cl_2$,

$CH_2=CHCONHCH_2CH(OH)CH_2NHCH_2CH_2CH_2Si(OC_2H_5)_3$, and

$CH_2=CHCONHCH_2CH_2CONHCH_2CH_2CONHCH_2CH_2CH_2Si(OC_2H_5)_3$.

24. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is a methacrylamide linker selected from the group consisting of:

$CH_2=C(CH_3)CONHCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=C(CH_3)CONHCH_2CH_2CH_2SiCl_3$,

$CH_2=C(CH_3)CONHCH_2CH_2CH_2Si(CH_3)(OCH_3)_2$,

$CH_2=C(CH_3)CONHCH_2CH_2CH_2Si(CH_3)_2(OCH_3)$,

$CH_2=C(CH_3)CONHCH_2CH_2CH_2Si(CH_3)Cl_2$, and

$CH_2=C(CH_3)CONHCH_2CH(OH)CH_2NHCH_2CH_2CH_2Si(OC_2H_5)_3$.

25. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is an allyl derivative linker selected from the group consisting of:

$CH_2=CHCH_2NHCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=CHCH_2SiH(OCH_3)_2$,

$CH_2=CHCH_2Si(CH_3)_2Cl$,

$CH_2=CHCH_2SiHCl_2$, and

$CH_2=CHCH_2Si(OCH_3)_3$.

26. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is an amino derivative linker selected from the group consisting of:

$H_2NCH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$,

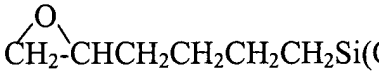
$H_2NCH_2CH_2CH_2CH_2CH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$,

$H_2NCH_2CH_2CH_2Si(OCH_3)_3$, and

$H_2NCH_2CH_2CH_2Si(OC_2H_5)_3$.

27. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 4 wherein the linker is an epoxy derivative linker selected from the group consisting of:


and



28. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 5 wherein the linker is $H_2NCH_2CH_2CH_2Si(OCH_3)_3$.

29. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 5 wherein the linker is $H_2NCH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$.

30. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 5 wherein the linker is $CH_2=C(CH_3)COOCH_2CH_2CH_2Si(OCH_3)_3$.

31. (Canceled)

32. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1wherein the resulting covalent attachment between the electrode and the linker and the permeation layer material is stable at a current density of at least 0.2 $nA/\mu m^2$.

33. (Currently Amended) The ~~electronically addressable microchip~~ device of claim 1wherein the resulting covalent attachment between the electrode and the linker and the permeation layer material is stable at a current density of at least 0.4 $nA/\mu m^2$.